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(71)Applicant : SUBARU:KK

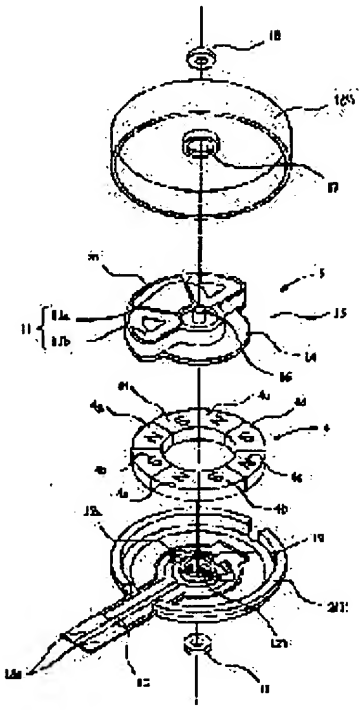
(72)Inventor : HAMADA KOICHI

(54) FLAT TYPE VIBRATION MOTOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a flat type vibration motor in which the manufacturing cost is reduced by providing only two armature coils and eliminating dead points for starting.

SOLUTION: An annular starter 4 divided into eight equal sections in the peripheral direction and alternately magnetized to N poles and S poles and rotor 5 of almost fan shape having its face facing the starter 4 and rotatable freely are disposed in a casing 3, and two armature coils 11 of the 60° coil winding angle are provided at the 120° disposing position on the rotor 5, and a non-magnetic weight member 21 is provided between two armature coils 11, and a commutator base 14 with twelve commutators provided in parallel with in the peripheral direction is fixed and a air of brushes 12 are brought into contact with the above commutators at the 135° electric angle in a casing 3.



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* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
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CLAIMS

[Claim(s)]
[Claim 1] The flat mold vibrating motor characterized by having the following requirements.
(b) A ring-like stator is prepared in casing of the shape of a flat cylinder. This stator is supported to revolve free [a revolution] while Rota of an abbreviation flabellate form carries out field opposite at the above-mentioned stator into the magnetizing [by N pole and the south pole]-by turns (b) [while 8 ****s is made a hoop direction] above-mentioned casing. While the 1st [by which the coiling include angle was formed in 60 degrees], and 2nd two armature coil is arranged in this Rota at arrangement pitch 120 degree The commutator substrate with which 12 commutators were installed in the hoop direction side by side is formed in arranging [the spindle member of non-magnetic material]-between two above-mentioned armature coils (Ha) above-mentioned Rota. The 1st, 4th, 7th, and 10th commutator is the 1st conductor, and the 2nd, 5th, 8th, and 11th commutator is the 2nd conductor. The 3rd, 6th, 9th, and 12th commutator is short-circuited with the 3rd conductor, respectively. The cut water of the 1st armature coil to the 2nd conductor at the 1st conductor the cut water of the 2nd armature coil One pair of brushes which supply power to the carrying-out [connection of the volume end of the 1st and 2nd armature coils]-to 3rd conductor (d) above-mentioned armature coil It is formed so that the above-mentioned commutator may be contacted at 135 degrees of electrical angles.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the small flat mold vibrating motor used in order to tell arrival of the mail by oscillation by the cellular phone, a pocket bell, etc.
[0002]
[Description of the Prior Art] Conventionally, as this kind of a flat mold vibrating motor, the flat iron core loess vibrating motor currently indicated by JP,6-205565,A is known, for example. The magnet section by which this flat iron core loess vibrating motor was fixed to the pars basilaris ossis occipitalis of casing, It is what consisted of shafts allotted to the part of the important point of arranged Rota of an abbreviation flabellate form which can be rotated, and this Rota so that field opposite might be carried out with this magnet section, arranged three armature coils in Rota at the abbreviation flabellate form, and was fabricated by resin material to one. While a centrifugal force works and generating an oscillation by having carried out eccentricity of Rota itself at the time of a revolution of Rota, it is designed by equipping three armature coils on Rota so that the starting dead point may not occur.
[0003]
[Problem(s) to be Solved by the Invention] However, in an above-mentioned flat mold vibrating motor, since torque occurs by the field with a magnet to three coils with which the direction where a current flows changes by turns, at least three coils are needed. Since turning effort did not occur in the armature coil with which the angle of rotation was located in the polarity of a magnet when Rota stopped in armature coil about 90 degrees or less, this was not able to reduce an armature coil simply from Rota equipped with three armature coils in the conventional flat mold vibrating motor.
[0004] This invention should cancel the above-mentioned trouble, and offer a flat mold vibrating motor without the starting dead point while it makes an armature coil two pieces and aims at reduction of a manufacturing cost.
[0005]
[Means for Solving the Problem] In order to solve said technical problem, the flat mold vibrating motor concerning this invention is characterized by having the following requirements.
(b) A ring-like stator is prepared in casing of the shape of a flat cylinder. This stator is supported to revolve free [a revolution] while Rota of an abbreviation flabellate form carries out field opposite at the above-mentioned stator into the magnetizing [by N pole and the south pole]-by turns (b) [while 8 ****s is made a hoop direction] above-mentioned casing. While two armature coils with a coiling include angle of 60 degrees are arranged at arrangement pitch 120 degree in this Rota Between the two above-mentioned armature coils, the commutator substrate with which 12 commutators were installed by the hoop direction is formed in arranging [the spindle member of non-magnetic material] (Ha) above-mentioned Rota. The 1st, 4th, 7th, and 10th commutator is the 1st conductor, and the 2nd, 5th, 8th, and 11th commutator is the 2nd conductor. The 3rd, 6th, 9th, and 12th commutator is short-circuited with the 3rd conductor, respectively. The cut water of the 1st armature coil to the 2nd conductor at the 1st conductor the cut water of the 2nd armature coil One pair of brushes which supply power to the

carrying-out [connection of the volume end of the 1st and 2nd armature coils]-to 3rd conductor (d) above-mentioned armature coil Thing [0006] currently formed so that the above-mentioned commutator may be contacted at 135 degrees of electrical angles

[Embodiment of the Invention] Drawing 1 and drawing 2 show the decomposition perspective view and important section drawing of longitudinal section of a flat mold vibrating motor (henceforth a motor) concerning this invention, and the ring-like stator 4 and Rota 5 of an abbreviation flabellate form are arranged inside [this motor consists of a case 1 of the shape of a flat cylinder with which the upper bed was closed, and a disc-like bracket 2 which fits into opening by the side of the soffit of this case 1] casing 3.

[0007] The commutator 10 which was formed in the ring-like stator 4 and the underside of Rota 5 at the bracket 2 and which is mentioned later is contacted. The brushes 12a and 12b of the couple which passes a current to an armature coil 11 are arranged. These brushes 12a and 12b It is soldered on the brush base 13 formed so that the lead wire which is not illustrated to edge 13a might be soldered and it could connect with a power source. Brush 12a of a positive electrode and brush 12b of a negative electrode As shown in drawing 3 , it is arranged so that points of contact a and b may contact the above-mentioned commutator 10 at 135 degrees of electrical angles.

[0008] In addition, it is suitably fixed [adhesives] with the means on the bracket 2 so that the amount of contact surface which it consists of eight stators 4a-4h which 8 ****s of the above-mentioned stators 4 were made into the hoop direction, and was formed in the flabellate form of 45 degrees of extension, respectively, and each stator is magnetized by turns by N pole and the south pole, and contacts the commutator 10 of two brushes 12a and 12b on the boundary of a magnetic pole may be in agreement.

[0009] As Rota 5 is shown in the top view of drawing 4 (a), (b), and (c), a bottom view, and the X-X' line sectional view of a top view Whenever [extension / which has been arranged at arrangement pitch 120 degree on both sides of the revolving shaft 16 prepared in the part of the important point of Rota 5] The monotonous 1st of a 60-degree abbreviation flabellate form, and the 2nd two armature coil 11a and 11b, The monotonous spindle member 21 formed in the 60-degree abbreviation flabellate form whenever [extension] with the metal of the non-magnetic material arranged between armature coil 11a of the above 1st and 2nd armature coil 11b It is what was fixed by resin 15 and formed on the tabular commutator substrate 14 of an abbreviation flabellate form at one. To drawing 1 , and the metal 18 to which a revolving shaft 16 fits into the opening 17 formed in the core of a case 1 as shown in drawing 2 , While the commutator substrate 14 carries out field opposite at a stator 4 with the metal 18 which fits into the opening 19 formed in the core of a bracket 2, it is supported to revolve by casing 3 free [a revolution].

[0010] And drawing 5 (a) and (b) show the top view and bottom view of the commutator substrate 14 before the 1st armature coil 11a, the 2nd armature coil 11b, and the spindle member 21 are fixed by resin 15. In the front face of this commutator substrate 14, the 1st armature coil 11a, Printed-circuit 20a which is a conductor for soldering the 2nd start edge and termination of armature coil 11b, respectively, 20b and 20c are formed and in the soldering section 22 of printed-circuit 20a whose start edge of 1st armature coil 11a is the 1st conductor The termination of 1st armature coil 11a and 2nd armature coil 11b is soldered to the soldering section 24 of printed-circuit 20c which is the 3rd conductor at the soldering section 23 of printed-circuit 20b whose start edge of 2nd armature coil 11b is the 2nd conductor, respectively.

[0011] Furthermore, as shown in drawing 5 (b), Commutators 10a-10l. are arranged in the rear face of the commutator substrate 14 by the radial. Commutators 10a, 10d, 10g, and 10j are connected with printed-circuit 20a too hastily through through holes 30a-30d. Commutators 10b, 10e, 10h, and 10k are connected with printed-circuit 20b too hastily through through holes 31a-31d. As Commutators 10c, 10f, 10i, and 10l. are short-circuited by the ring-like printed circuit 32, and are connected with printed-circuit 20c too hastily through a through hole 33 and it is shown in the bottom view of drawing 4 (b) It connects with the commutators 10a-10l. formed in the rear-face side of the commutator substrate 14 corresponding to the 1st and the 2nd armature coil 11a and 11b, and as shown in the schematics of drawing 6 (a), connection of Commutators 10a-10l. and the armature coils 11a and 11b is carried out.

[0012] In addition, in drawing 6 (a), a sign 35 is resistance for electric noise prevention. Moreover, drawing 6 (b) shows the development view showing the relative position of the contacts a and b of Rota 5, Commutators 10a-10l., Stators 4a-4h, and Brushes 12a and 12b. Next, with reference to drawing 7 - drawing 9 , while explaining the actuation mode of an above-mentioned flat mold vibrating motor, it explains that there is no starting dead point.
[0013] The force acts on a coil in the fixed direction with the principle of Fleming by the direction of a current and the field of a stator which flow in a coil while the electrical potential difference is impressed to the coil through the brush. Although an operation of the force by the field of a stator will not be received but a revolution of Rota will stop since a current does not flow in a coil unless this operation serves as turning effort, Rota rotates and an electrical potential difference is impressed, that halt location is not pinpointed.
[0014] a location in case Rota of drawing 7 (a) is 0 degree -- being shown -- a current -- brush 12a-> commutator 10h-> armature coil 11b-> commutator 10f-> commutator 10c-> brush 12b -- and Since it flows in the direction of an arrow head in order of brush 12a-> commutator 10g-> commutator 10d-> armature coil 11a-> commutator 10f-> commutator 10c-> brush 12b The turning effort of 2F can occur in an arrow head A and the direction of A' with the left-hand rule of Fleming between stator 4b, armature coil 11a and stator 4c, and armature coil 11b, and Rota 5 can be started.
[0015] Moreover, since drawing 7 (b) shows a location in case Rota is 15 degrees and a current flows in the direction of an arrow head in order of brush 12a-> commutator 10g-> commutator 10d-> armature coil 11a-> commutator 10f-> commutator 10c-> brush 12b The turning effort of 2F can occur in the direction of an arrow head B and B' between Stators 4a and 4b and armature coil 11a with the left-hand rule of Fleming, and Rota 5 can be started.
[0016] And drawing 7 (c) shows a location in case Rota is 30 degrees, and since a current flows in the direction of an arrow head in order of brush 12a-> commutator 10f-> armature coil 11b-> commutator 10h-> commutator 10b-> brush 12b, a current The turning effort of 2F can occur in the direction of an arrow head C and C' between Stators 4d and 4e and armature coil 11b with the left-hand rule of Fleming, and Rota 5 can be started.
[0017] furthermore, a location in case Rota of drawing 7 (d) is 45 degrees -- being shown -- a current -- brush 12a-> commutator 10f-> armature coil 11b-> commutator 10h-> commutator 10b-> brush 12b -- and Since it flows in the direction of an arrow head in order of brush 12a-> commutator 10f-> armature coil 11a-> commutator 10d-> commutator 10a-> brush 12b The turning effort of 2F can occur in the direction of an arrow head D and D' with the left-hand rule of Fleming between stator 4c, armature coil 11a, and 4d of stators and armature coil 11b, and Rota 5 can be started.
[0018] Similarly, as are shown in drawing 8 (a) - (d), and Rota shows 60 degrees, 75 degrees, 90 degrees, 105 degrees, and drawing 9 (a) - (d) Rota 5 can be started even if it is in which location which is 165 degrees - 360 degrees, although Rota can be started similarly and it does not illustrate, even if Rota is located in the location which are 120 degrees, 135 degrees, and 150-degree165 ".
[0019] Since Brushes 12a and 12b surely touch the commutator 10 no matter Rota 5 may stop in what location, as mentioned above, the current supplied through a brush Since it flows selectively to both both [either or] 11a and 11b so that it may generate with torque (2F) with the fixed force of always acting on both both [either or] 11a and 11b in the same direction by the field of a stator Even if it does not regulate the halt location of Rota in the location defined beforehand, a motor without the starting dead point is realizable.
[0020] Moreover, while explaining that it can be started even if drawing 7 (a) - (d) drawing 8 (a) - (d) and drawing 9 (a) - (d) has Rota in which location While it is shown that Rota continues and rotates in the same direction and the electrical potential difference is supplied to the brush, since a current flows so that fixed torque (2F) may always occur in the fixed direction to a stator 4 in both both [either or] 11a and 11b, a revolution is maintainable.
[0021] Drawing 10 (a) - (d) shows the case where the arrangement pitch of armature coils 11a and 11b is made into 165 degrees. In addition, in the case of drawing 10 (a) The turning effort of F occurs in the direction of arrow-head V between armature coil 11b and 4d of stators, and when it is drawing 10 (b)

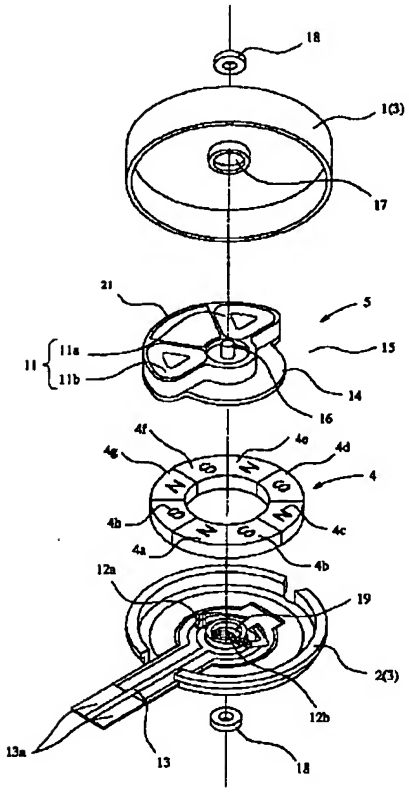
The turning effort of 2F occurs in an arrow head W and the direction of W' between armature coil 11a and Stators 4a and 4b, and when it is drawing 10 (c) Between armature coil 11a, stator 4a and armature coil 11b, and Stators 4e and 4f, the turning effort of 3F occurs in the direction of X", and an arrow head X, X', and when it is drawing 10 (d) The turning effort of F will occur in the direction of arrow-head Y between armature coil 11b and stator 4e. When not stabilized with F-3F, the turning effort has a possibility that it cannot start, and turning effort cannot rotate it at F with the torque by which the motor which made the arrangement pitch of this invention 120 degrees was stabilized unlike being the always same turning effort (2F).

[0022]

[Effect of the Invention] Starting and a revolution can be made to carry out Rota in the fixed direction certainly, without regulating the halt location of Rota, since a current can be passed to an armature coil so that it may generate with torque with the fixed force of being in the condition that the brush always contacted the commutator even if it stopped supply of the electrical potential difference to a motor according to this invention and Rota stopped, and moreover always acting on an armature coil in the same direction by the field of a stator. Furthermore, a bigger oscillation can be generated though it is small, since the big spindle member as a whole was prepared.

[0023] Moreover, while being able to aim at reduction of a manufacturing cost by setting the number of coils to two, since it is not necessary to perform special processing for pinpointing the halt location of Rota to a coil, or to add special components, simplification of a production process and improvement in the yield of a product can be aimed at, and a motor with high productive efficiency can be realized.

[Translation done.]


18
1(3)
17
21
5
11a
11b
11
15
14
16
4f
4e
4d
4g
4
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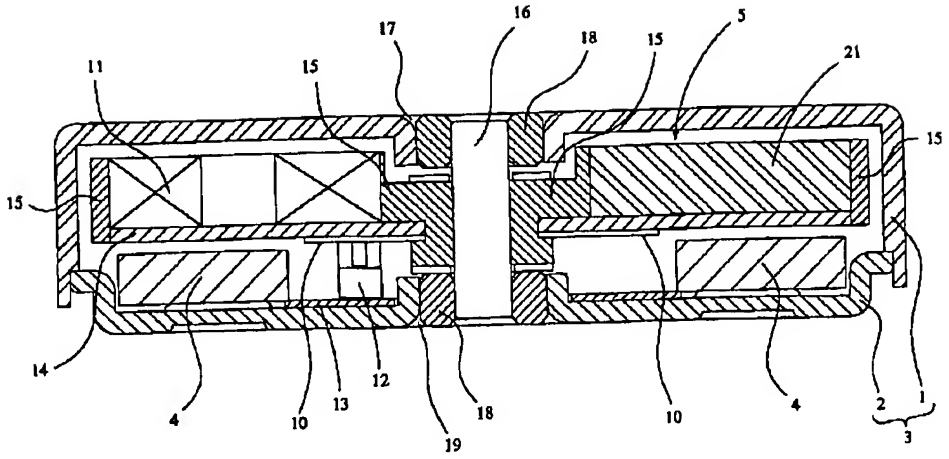
12a
19
2(3)
12b
13a
13
18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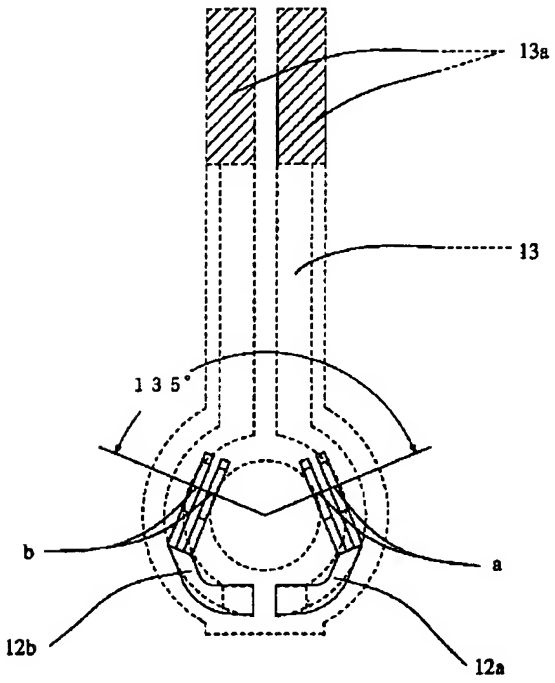
1
3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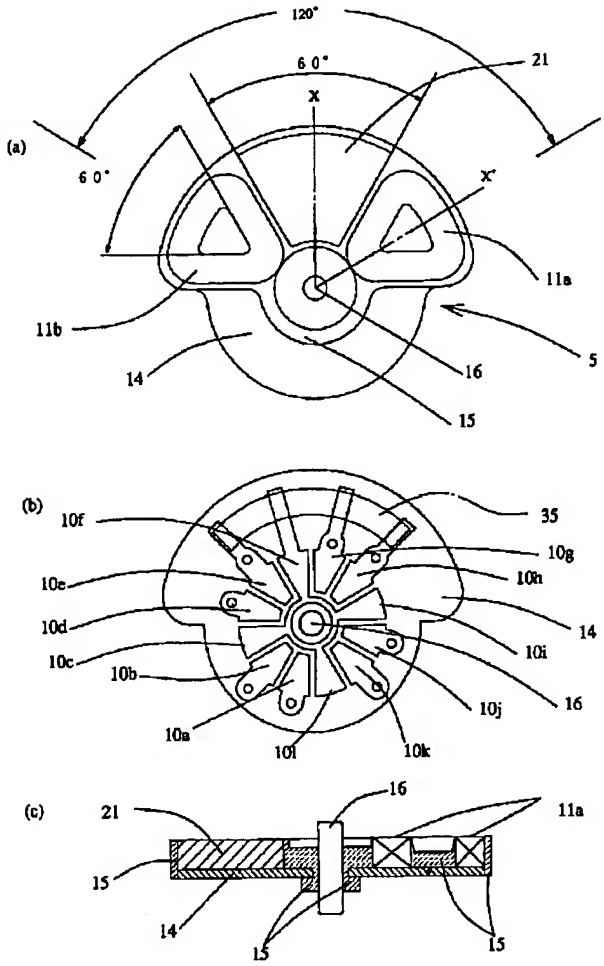
13
135°
b
a
12b
12a



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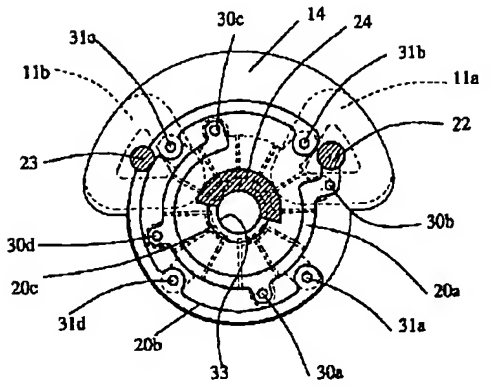
(a)


30c
14
24
31a
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11a
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30d
20c
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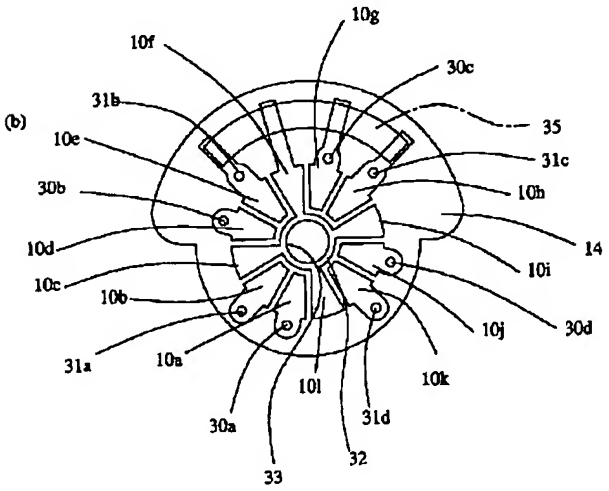
31a
20b
33
30a

(b)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10f
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31b
35
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30b
10h
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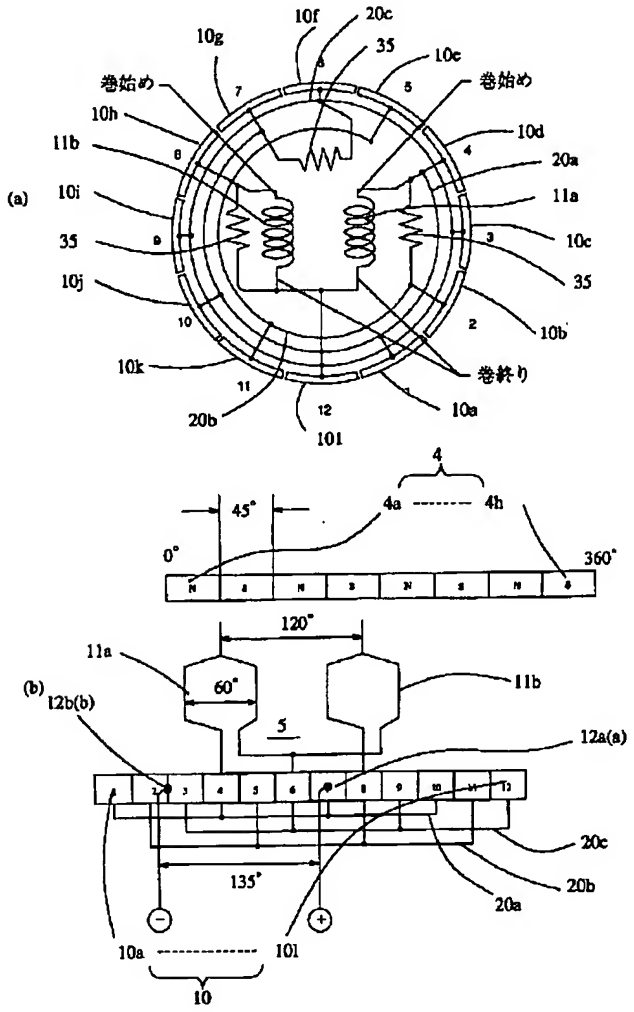
10k
10l
31d
30a
32
33



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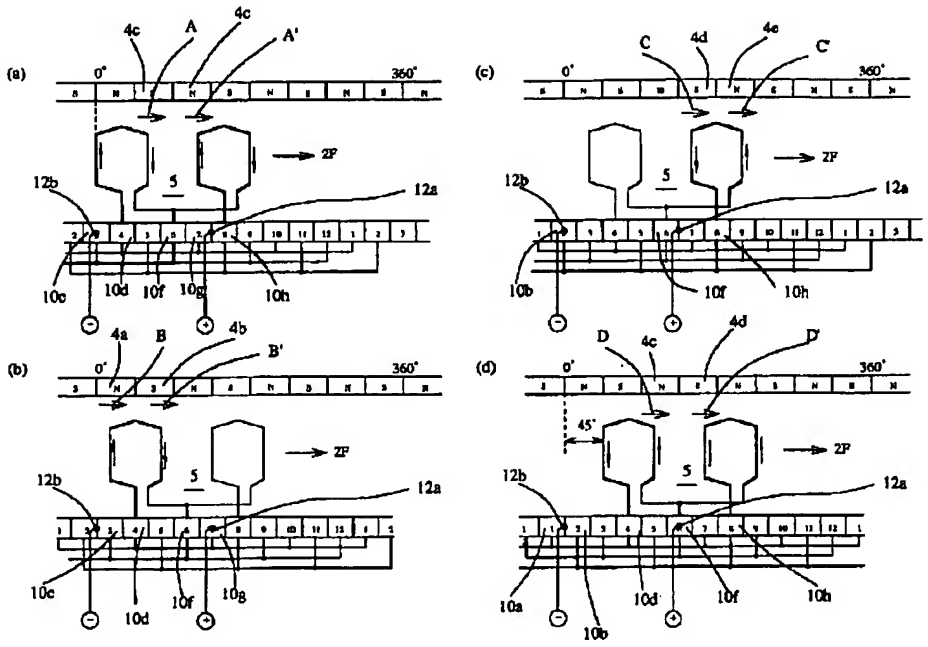
(a)
(b)
(c)
(d)
0°
360°
4c
A
A'
4a
B
B'
4b
C
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10a
10b
10c
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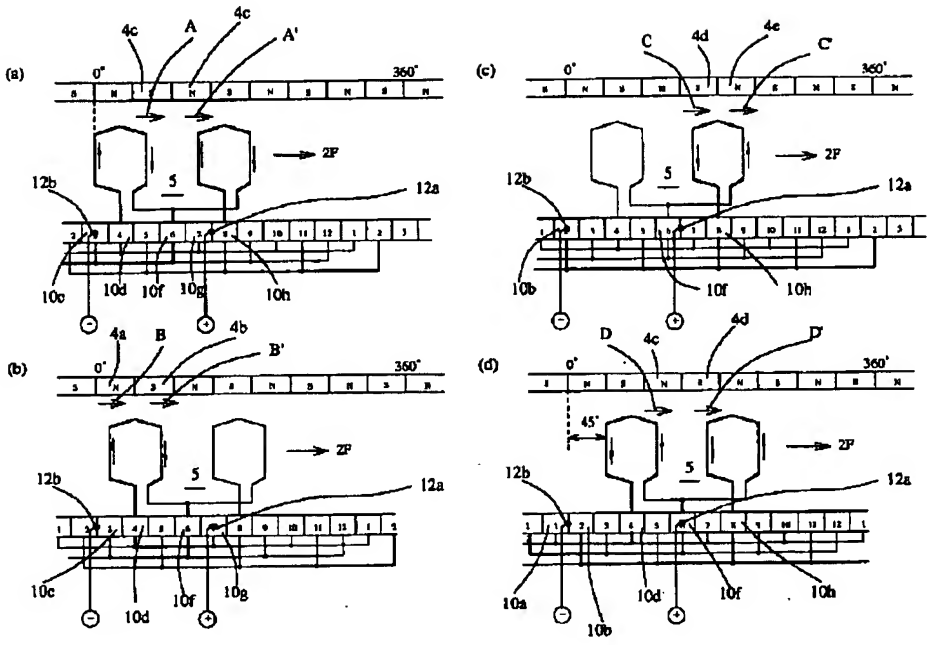
10f
10g
10h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4c
A
4c
A'
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360°
2F
12b
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4a
B
4b
B'
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360°
2F
12b
5
12a
10c
10d
10f
10g
(c)
C
4d
4e
C'
0°
360°
2F
12b
5
12a
10b
10f
10h
(d)
D
4c
4d
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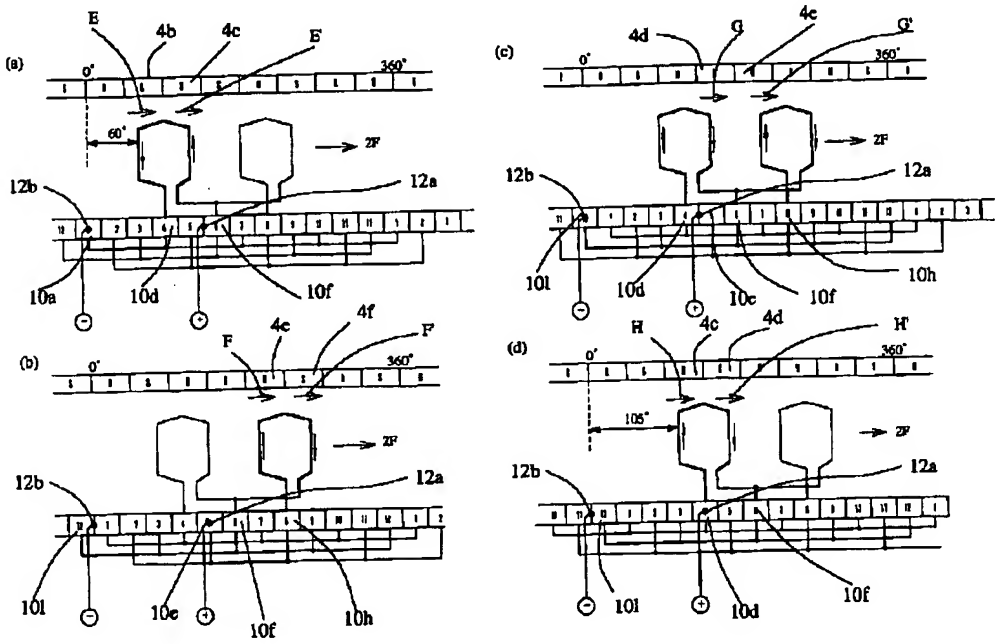
10b
10d
10f
10h


(a)
E
4b
4c
E'
0°
360°
60°
ZF
12b
12a
10a
10d
10f
(b)
F
4c
4f
F'
0°
360°
ZF
12b
12a
10l
10e
10f
10h
(c)
4d
G
4c
G'
0°
360°
ZF
12b
12a
10l
10d
10e
10f
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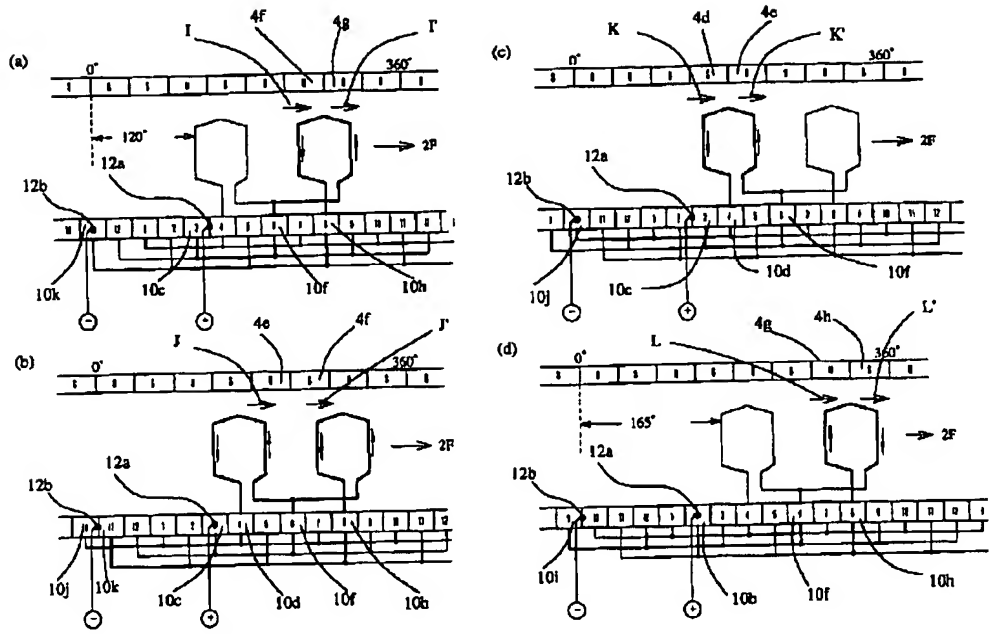
ZF
12b
12a
10l
10d
10f


(a)
I
4f
4g
I'
0°
360°
120°
2F
12a
12b
10k
10c
10f
10h
(b)
J
4e
4f
J'
0°
360°
2F
12a
12b
10j
10k
10c
10d
10f
10h
(c)
K
4d
4e
K'
0°
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2F
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12b
10j
10c
10d
10f
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4h
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12b
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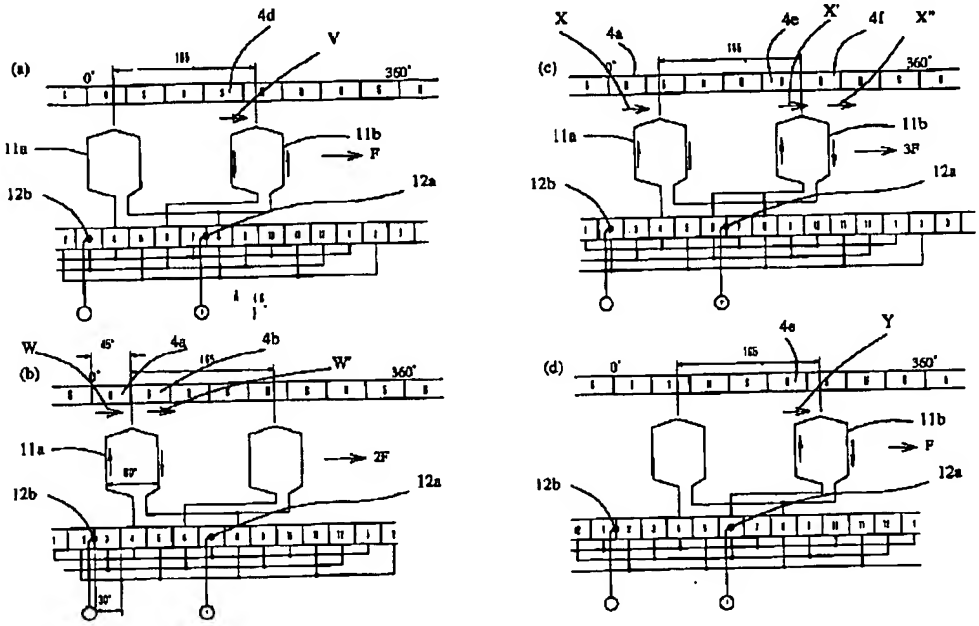
10b
10f
10h


(a)
4d
V
0°
165
360°
11a
11b
F
12b
12a
(b)
W
45°
4a
4b
W'
360°
11a
2F
12b
12a
(c)
X
4a
4e
X'
4f
X"
360°
11a
11b
3F
12b
12a
(d)
4e
Y
0°
165
360°
11b
F
12b
12a